

Amendment and Response Under 37 C.F.R. 1.116

Applicant: Lizhang Yang

Serial No.: 10/687,329

Filed: October 16, 2003

Docket No.: M120.243.101

Title: OPTICAL INTERCONNECT DEVICE

REMARKS

The following remarks are made in response to the Final Office Action mailed October 18, 2005, in which claims 1-4 and 6-15 were rejected. With this Response, claim 1 has been amended. Claims 1-4 and 6-15 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 103

Claims 1-4 and 6-15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuyama et al. (U.S. Patent No. 6,231,244).

The Office Action alleges that Fukuyama et al. discloses, in Figure 2, an optical interconnect device comprising: a fiber optic cable (46a) having two ends and comprising a plurality of optical fibers (48) each surrounded by a protective jacket (not labeled), wherein a diameter of the fiber optic cable is larger than a diameter of each optical fiber and where the protective jacket of at least a first end of the fiber optic cable has been removed thereby exposing the optical fiber; a ribbonized assembly (49) encasing a portion of the first end of the fiber optic cable and the optical fibers, where the fiber optic cable occupies an input zone, the fiber occupies an output zone, the cable and fibers both occupy a transition zone in which the fibers are non-parallel, and the optical fibers in the output zone lie parallel to one another and have a first pitch; and a ferrule (not labeled) attached to the ribbonized assembly, the ferrule having a plurality of internal grooves (43) having a second pitch; wherein the first pitch of the optical fibers is substantially equal to the second pitch of the ferrule.

Alleging that Fukuyama et al. discloses the instant claimed invention except for a plurality of fiber optic cables, the Office Action concludes it would have been obvious to one of ordinary skill in the art at the time the invention was made to separate Fukuyama et al.'s cable to have a plurality of fiber optic cables, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art.

The Examiner's rejection as it is applied to the subject matter of independent claim 1 is respectfully traversed. Referring to Section 706.02 (j) of the MPEP, to establish a *prima facie* case of obviousness, three basic criteria must be met:

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- (1) There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference to combine reference teachings;
- (2) There must be reasonable expectation of success;
- (3) The prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Appellant's disclosure. See *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (F.E.D. Cir. 1991).

Applicants have amended independent claim 1 to include the limitation that the fiber optic cables lie in a first plane and the optical fibers lie in a second plane substantially parallel to the first plane. The amendment is supported by the specification, *e.g.*, at Figs. 1, 2 and 6 and the corresponding portions of the detailed description.

Applicants respectfully submit that Fukuyama et al. cannot support a case of *prima facie* obviousness as to the claims because, among other possible reasons, the reference fails to disclose all of the elements of the present invention. In particular, Fukuyama et al. fails to disclose at least "a ribbonized assembly encasing a portion of the first ends of the fiber optic cables and the optical fibers, where the fiber optic cables lie in a first plane and occupy an input zone, the fibers lie in a second plane substantially parallel to the first plane and occupy an output zone, the cables and fibers both occupy a transition zone in which the fibers are non-parallel, and the optical fibers in the output zone lie parallel to one another and have a first pitch."

Fukuyama et al. discloses a half-pitch optical fiber array used to reduce the conventional waveguide pitch of 250 μm by about half. To accomplish this objective, two cables 46a, 46b (each having a plurality of optical fibers 48 evenly spaced along the width of the cable) are mutually overlapped, such that the fibers 48 of the overlapped cables are alternately aligned in the grooves 43. (See, for example, Fig. 7). The spacing between fibers 48 of each cable remain constant (i.e., the fibers 48 of each cable 46a, 46b remain parallel to each other), but the spacing of the fibers 48 of the "combined" cables is about one half of the spacing of the fibers in a single cable. Only a single fiber 48 of each cable 46a, 46b is visible in the side view of Fig. 2.

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Referring to Fig. 2 of Fukuyama et al., the Office Action characterizes element 49 as a “ribbonized assembly” as set forth in claim 1, and further characterizes as a “ferrule” that portion of the device of Fukuyama et al. having a plurality of internal grooves (43). Accordingly, the portion of the device having grooves 43 cannot also be considered as part of the “ribbonized assembly” of the claimed invention. As described in the reference, element 49 is “a covered fiber housing substrate.” (col. 3, lines 58-59). The lower “V-shaped groove substrate 41 and the covered fiber housing substrate 49 are stuck and fixed together to form a covered fiber housing groove 54.” (col. 3, lines 60-63). That is, element 49 is configured to cover only the “non-stripped” portion of the cables 46a, 46b. It can be seen that fibers 48 extend beyond element 49 as they pass through area 51 toward grooves 43.

Using the characterization of Fukuyama et al. set forth in the Office Action, it is clear that element 49 (the alleged “ribbonized assembly”) does not encase a portion of the first ends of the fiber optic cables and the optical fibers, where the fiber optic cables lie in a first plane and occupy an input zone, the fibers lie in a second plane substantially parallel to the first plane and occupy an output zone, the cables and fibers both occupy a transition zone in which the fibers are non-parallel, and the optical fibers in the output zone lie parallel to one another and have a first pitch, as set forth in amended claim 1. Rather, when viewed from the top of the device of Fukuyama et al., the fibers 48 of each respective cable 46a, 46b remain parallel to one another as the fibers 48 traverse from one side of the device to the other side of the device. That is, there is no “transition zone in which the fibers are non-parallel”. When viewed from a side of the device of Fukuyama et al., the fibers 48 of one cable 46a are non-parallel to the fibers 48 of the other cable 46b. However, in that instance, the cables 46a, 46b define a plane that is substantially perpendicular to the plane of the parallel fibers in grooves 43, in contrast to the language of claim 1 which requires that the fiber optic cables lie in a first plane and the fibers lie in a second plane substantially parallel to the first plane.

For at least this reason, Applicants submit that Fukuyama et al. cannot support a rejection of the claimed invention under 35 U.S.C. 103(a), and respectfully request that the rejection be withdrawn.

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Claims 2-4 and 6-15 depend, either directly or indirectly, from independent claim 1 which is in allowable condition for at least the reasons set forth above. Accordingly, dependent claims 2-4 and 6-15 are also in allowable condition, and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

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CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 1-4 and 6-15 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of the claims is respectfully requested.

Any inquiry regarding this Amendment and Response should be directed to either Matthew B. McNutt at Telephone No. (512) 231-0531, Facsimile No. (512) 231-0540 or Gregg Rosenblatt at Telephone No. (512) 984-7443, Facsimile (512) 984-2020. In addition, all correspondence should continue to be directed to the following address:

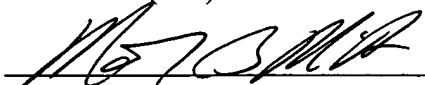
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Respectfully submitted,

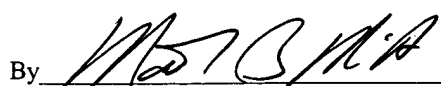
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CERTIFICATE UNDER 37 C.F.R. 1.8: The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail, in an envelope address to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 16th day of Dec., 2005.

By 
Name: Matt B. McNutt